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NOTES ON WESTERN ERYSIPHEÆ AND PERONOSPOREÆ.

BY S. M. TRACY AND B. T. GALLOWAY.

During the past two years the writers have collected *Erysipheæ* and *Peronosporeæ* in Missouri, Wisconsin, Colorado, New Mexico, Utah, Arizona and southern California. It has been a matter of no little surprise to them to find how wide is the distribution of most species of *Erysipheæ*, there being very few mentioned in any of the catalogues published in the western states which have not been found in widely separated localities. The distribution of most species has been found to be much wider than is that of any one of its hosts. Where a species is commonly limited to plants of a single order in any locality, it has not in any case been found on plants outside that order, although in some cases when new genera were noted in the flora, the fungus was no longer found upon the hosts where first observed. As an instance of this, *Podosphæra oxycanthæ* is frequently found on several species of *Cratægus* and *Prunus* in the Mississippi valley, while in the Rocky Mountain region, where both *Cratægus* and *Prunus* are found abundantly, the *Podosphæra* is found on *Prunus demissa*, a near relative of *P. Virginiana* and has not been noted upon *Cratægus* or *P. Virginiana*, which are both abundant. In the west, *Erysiphe cichoraceareum*, DC., takes *Stachys palustris* as its host in the place of *Teucrium* in the east; *Mertensia*, the place of *Hydrophyllum;* and many other similar instances will be noted in the accompanying list. The number of *Peronosporeæ* found in the arid regions was very small, and the few which were taken were, without exception, found high on the mountains or in deep mountain canons, where the melting snows furnished constant and abundant moisture. The accompanying list does not claim to approach completeness except for Missouri, the notes from other states being added simply as a matter of record.

ERYSIPHEÆ.

SPHÆROTHECA CASTAGNEI, Lev.—On *Taraxacum officinale*, *Bidens frondosa*, *Vernonia noveboracensis* (Missouri); *Viola cucullata*, *Viola canina*, var. *sylvestris* (Golden, Colorado).

SPHÆROTHECA HUMULI (DC.) Burrill.—On *Agrimonia eupatoria* (Missouri); *Geum macrophyllum* (Wisconsin).

SPHÆROTHECA MORS UVÆ (Schw.) B. & C.—On *Ribes rotundifolium* (Missouri). The perithecia were found only on the fruit.

SPHÆROTHECA PANNOSA (Wallr.) Lev.—On *Rosa lucida* and cultivated Roses (Missouri). In our specimens, the appendages are colored near the base, as described by Tulasne (Fung. Carp. Select., I, page 208).

SPHÆROTHECA PRUINOSA, C. & P.—On *Rhus copallina* (Missouri). This species was collected in southern Missouri in 1886 and it agrees very well with the published description of the authors.

SPHÆROTHECA LANESTRIS, Hark.—This remarkable species was taken near Napa City, California, upon the young shoots of *Quercus agrifolia*. The tree from which the specimens were obtained was a large one, the trunk being fully two feet in diameter, and its peculiar appearance attracted attention a considerable distance. The dense mycelium completely covers the young leaves and twigs, causing the former to shrivel and cease growing before they attain one-fourth their usual size. The perithecia are frequently overlooked as they are buried in the dense mats of mycelium.

PODOSPHÆRA OXYCANTHÆ, DC.—On *Amelanchier Canadensis*, *Prunus domestica*, *Prunus cerasus*, *Spiræa*, *Cratægus crus-galli* (Missouri); *Cratægus oxycantha* (Wisconsin); *Prunus demissa* (Colorado and Utah). The form on *Spiræa* agrees with the published specimen in Ellis North American Fungi distributed as *Microsphæra*.

ERYSIPHE CICHORACEARUM, DC.—On *Verbena urticæfolia*, *Verbena hastata*, *Plantago major*, *Ambrosia trifida*, *Ambrosia artemisæfolia*, *Vernonia noveboracensis*, *Helianthus annuus*, *Galium aparine* (Missouri); *Aster corymbosus*, *Hydrophyllum Virginicum*, *Inula helenium*, *Phlox paniculata* (Wisconsin); *Solidago Canadensis*, *Stachys palustris*, *Dysodia chrysanthemoides*, *Verbesina enceliodes*, *Iva xanthiifolia* (Colorado); *Rudbeckia occidentalis*, *Helianthella Parryi*, *Mimulus luteus*, *Humulus lupulus*, *Mertensia Siberica*, *Ambrosia psilostachya* (Utah). It is seen that several of the hosts named above upon which this widely distributed species occurs are new, and yet in all the specimens examined we find the characters as set forth by Burrill and Winter quite constant throughout.

ERYSIPHE COMMUNIS (Wall.) Fr.—On *Pniaæ*, cult., *Dahlia*, cult., *Pea*, cult., *Phaseolus perennis*, *Phaseolus helvolus* (Missouri); *Astragalus Canadensis*, *Geranium maculatum*, *Clematis Virginiana*, *Aquilegia Canadensis* (Wisconsin); *Thermopsis Montana*, *Trifolium involucratum*, *Clematis ligustifolia* (Colorada); *Lathyrus polymorphus*, *Lupinus argenteus*, var. *argophyllus*, *Astragalus junceus*, *Astragalus Canadensis*, *Thermopsis* (Utah); *Ranunculus cymbalaria* (Nevada).

ERYSIPHE TORTILIS (Wallr.) Winter.—On *Cornus sanguinea* (Missouri).

ERYSIPHE GALEOPSIDIS, DC.—On *Scutellaria parvula* (Wisconsin).

ERYSIPHE GRAMINIS, DC. (?)—On *Elymus condensatus* (Palisade and Reno, Nevada). This fungus was found in abundance at the stations named and it is somewhat remarkable for its very large perithecia and the number of asci. The spores were not sufficiently developed to distinguish their number, so that for the present we have referred the species to *E. graminus*, of which it is probably only a form. Our specimens give the following characters:

Amphigenous, but most abundant upon the lower surface; mycelium persistent in irregular patches, sometimes covering the entire surface, reddish-brown; perithecia very large, 225—250 μ in diameter; appendages dark brown, short, crooked, scarcely distinguishable from the mycelium with which they are interwoven; asci 27—34, usually about 30, elliptical, spores not seen.

UNCINULA AMPELOPSIDIS, Pk.—On cultivated *Vitis*, *Ampelopsis quinquefolia* (Missouri and Wisconsin).

UNCINULA CIRCINATA, C. & P.—On *Acer dasycarpum* (Missouri).

UNCINULA FLEXUOSA, Pk.—On *Æsculus glabra* (Missouri). Our specimens of this species were contributed by Rev. C. H. Demetrio, who collected them in Perry county. They agree very well with specimens collected by Mr. Peck in New York.

UNCINULA MACROSPORA, Pk.—On *Ulmus Americana* (Missouri).

UNCINULA PARVULA, C. & P.—On *Celtis occidentalis* (Missouri).

UNCINULA SALICIS (DC.) Winter.—On *Salix falcata*, *Salix nigra* (Missouri); *Populus angulatus*, *Populus tremuloides* (Wisconsin).

MICROSPHÆRA RUSSELLII, Clinton.—On *Oxalis stricta* (Missouri).

MICROSPHÆRA DIFFUSA, C. & P.—On *Desmodium Canadense* (Missouri).

MICROSPHÆRA EUPHORBIÆ, B. & C.—On *Euphorbia corollata* (Missouri).

MICROSPHÆRA ALNI (DC.) Winter.—On *Viburnum prunifolium*, *Platanus occidentalis* (Missouri); *Celastrus scandens*, *Lonicera glauca*, *Cornus stolonifera* (Wisconsin).

MICROSPHÆRA FRIESII, Lev.—On *Syringa vulgaris* (Missouri).

MICROSPHÆRA QUERCINA (Schw.) Burrill.—On *Quercus rubra*, *Quercus alba* (Missouri).

MICROSPHÆRA RAVENELLII, Berk.—On *Gleditschia triacanthos* (Missouri).

MICROSPHÆRA SYMPHORICARPI, Howe.—On *Symphoricarpus vulgaris* (Missouri).

PHYLLACTINIA SUFFULTA (Reb.) Sacc.—On *Betula nigra*, *Cornus*, sp. (Missouri); *Celastrus scandens*, *Corylus Americana* (Wisconsin).

PERONOSPOREÆ.

PERONOSPORA ARTHURI, Farlow.—On *Œnothera biennis* (Missouri).

PERONOSPORA AUSTRALIS, Spez.—On *Sicyos angulatus* (Missouri).

PERONOSPORA VITICOLA (B. & C.) DeBy.—On *Vitis*, various species and cultivated varieties (Missouri).

PERONOSPORA HALSTEDII, Farlow.—On *Vernonia noveboracensis* (Missouri). So far as we know, this species has been collected but once within the borders of Missouri.

PERONOSPORA OBDUCENS (Schroter).—On *Impatiens pallida* (Missouri).

PERONOSPORA GERANII, Pk.—On *Geranium Carolinianum* (Missouri).

PERONOSPORA ENTOSPORA, B. & Br.—On *Aster novæ-angliæ* (Missouri).

PERONOSPORA ALTA, Fckl.—On *Plantago major* (Missouri).

PERONOSPORA GANGLIFORMIS (Berk.) DeBy.—On *Mulgedium*, sp. *Lactuca Canadensis* (Missouri).

PERONOSPORA SORDIDA, Berk.—On *Scrophularia nodosa* (Missouri).

CYSTOPUS BLITI (Biv.) Lev.—On *Amarantus retroflexus*, *Amarantus albidus* (Missouri and Colorado).

CYSTOPUS CANDIDUS (P.) Lev.—On *Capsella bursa-pastoris* (Missouri).

CYSTOPUS PORTULACÆ (DC.) Lev.—On *Portulaca oleracea* (Missouri).

CYSTOPUS CUBICUS (Strauss) Lev.—On *Tragopogon porrifolius*, *Senecio aureus* (Missouri); *Ambrosia artemisiæfolia* (Colorado and New Mexico).

SOME MILDEWS OF ILLINOIS.

BY L. H. PAMMEL, ST. LOUIS, MO.

For the past two seasons I have had an opportunity of collecting at several points in Illinois, near Chicago at Palatine, Cheltenham, Argyle Park and Lake View; also in the bottoms opposite St. Louis, which is a rich field for the collector not only in phænogams but fungi.

In the species enumerated, I have adopted the synonomy of the excellent paper on "The Erysipheæ of Illinois" by Prof. T. J. Burrill and Mr. F. S. Earle. From this paper it seems that some species are somewhat local, so that it will be of interest to add new localities for those and also such additional hosts as they were found on. One species new to the state has also been added.

SPHÆROTHECA CASTAGNEI, Lev.—On *Bidens chrysanthemoides*, Bluff Lake, Oct., '86; *B. connatus*, Bluff Lake, Nov., '87; *B. frondosa*, Chicago, Sept., '85; *Coreopsis aurea*, Argyle Pk., Aug., '87; *Taraxacum officinale*, Lake View, Sept., '85; *Veronica Virginica*, Bluff Lake,. Nov, '86.

SPHÆROTHECA HUMULI (DC.) Burrill.—On *Agrimonia Eupatoria*, Cheltenham, Sept., '85, Lake View, Aug., '87.

SPHÆROTHECA PANNOSA (Wallr.) Lev.—On *Rosa lucida*, Lake View, Aug., '87. Mycelium abundant on cultivated as well as wild Roses. Fruiting specimens not common.

ERYSIPHE COMMUNIS (Wallr.) Fr.—On *Amphicarpæa monoica*, Bluff Lake, Oct., '86; *Desmanthus brachylobus*, Bluff Lake, Oct., '87. Perithecia abundant on stems and branches. Fruit generally maturing after the leaves have fallen. *Ranunculus abortivus*, Fish Lake, Oct., '86. An abundance of mycelium was frequently found on young leaves and stems of *Astragalus Canadensis*, which very likely was the conidial stage of this species.

ERYSIPHE GALEOPSIDIS, DC.—On *Stachys palustris*, Bluff Lake, Oct., '86.

ERYSIPHE CICHORACEARUM, DC.—On *Ambrosia trifida*, East. St. Louis, Sept., '86, Lake View, Aug., '87; *Aster cordifolius*, Evanston, Aug., '86; *A. Drummondii*, Bluff Lake, Oct., '86, Lake View, Aug., '86; *A. diffusus*, Indian Lake, Oct., '87; *A. ericoides*, Fish Lake, Oct., '87; *A. junceus*, Lake View. Asci very often with three ascospores; *A. sagittifolius*, Bluff Lake, Oct., '87; *Cnicus altissima*, Bluff Lake, Oct., '87; *C. altissima*, var. *discolor*, Indian Lake, Oct., '87; *Helianthus annuus*, Lake View, Sept., '85; *H. doronicoides*, Fish Lake, Oct., '87; *H. grosseserratus*, Bluff Lake, Oct., '86; Cult. *H. tuberosus*, Cheltenham, Oct., '85; *Pilea pumila*, Bluff Lake, Oct., '87; *Solidago Canadensis*, Bluff Lake, Oct., '87; *Tecoma radicans*, Bluff Lake, Oct., '86; *Verbena stricta*, Cheltenham, Oct., '85; *V. urticæfolia*, Bluff Lake, Oct., '87; *Vernonia Baldwinii*, East St. Louis, Oct., '86; *V. fasciculata*, Indian Lake, Oct., '87; *Xanthium Canadense*, Lake View, Oct., '85, East St. Louis, Oct., '87.

UNCINULA AMPELOPSIDIS, Pk.—On *Ampelopsis quinquefolia*, Cheltenham, Oct., '85, Lake View, Sept., '86, Bluff Lake, Oct., '87; cult. *Vitis*, Englewood, Aug., '86, East St. Louis, Oct., '87. An abundance of mycelium on *Vitis cinerea*, East St. Louis, somewhat later I found good fruiting material on cultivated specimens of the same species in Botanic Garden.

UNCINULA CIRCINATA, C. & P.—On *Acer dasycarpum*, Bluff Lake, Oct., '86, Oct., '87; very common. Our specimens are amphigenous, in some there is an abundance of mycelium on the upper as well as the lower surface of the leaf. The lower surface of the leaf is often covered quite uniformly with the persistent mycelium; on the upper it appears in roundish patches, which are often confluent with age.

UNCINULA GENICULATA, Gerard (in Bull. Torrey Bot. Club, Vol. IV, p. 48). Epiphyllous; mycelium persistent, in roundish spots or sometimes covering the entire upper surface of the leaf, not conspicuous; perithecia small, 80—90 μ in diameter, opaque, reticulations small, appendages hyaline, roughened, and often geniculate, usually twice as long as the diameter of the perithecium; asci 6—8, ovate; pedicels short; ascospores 4—6, usually 6, elliptical or oval, 7—12 x 12—16 μ. On *Morus rubra*, Bluff Lake, Oct., '86, Oct., '87.

UNCINULA MACROSPORA, Peck.—On *Ulmus Americana*, Bluff Lake, Oct., '86.

UNCINULA SALICIS (?) [DC.] Winter.—On *Salix*, sp., Cheltenham, Oct., '85; *S. cordata*, Lake View, Aug., '86.

PODOSPHÆRA OXYACANTHÆ (DC.) DBy.—On *Prunus Cerasus*, Englewood, Sept., '85; Fish Lake, Oct., '86. Frequently accompanied with *Cicinobolus Cessattii*, DBy.

MICROSPHÆRA ALNI (DC.) Winter.—On *Corylus Americana*, Palatine, Aug., '86; *Enonymus atropurpureus*, Bluff Lake, Oct., '87; *Forestiera acuminata*, Indian Lake, Sept., '86, Oct., '87; *Lonicera glauca*, Lake View, Aug., '86; *Sambucus Canadensis*, Cheltenham, Oct., '85, Lake View, Aug., '86, Bluff Lake, Oct., '86; *Syringa vulgaris*, Cheltenham, Oct., '85, Englewood, Oct., '85, Chicago, Aug., '86; *Lonicera glauca*, Lake View, Aug., '86.

MICROSPHÆRA DIFFUSA, C. & P.—On *Desmodium Canadense*, Cheltenham, Oct., '85, Lake View, Aug., '86; *D. canescens*, Lake View, Aug., '86.

MICROSPHÆRA ELEVATA, Burrill.—On *Catalpa*, sp., East St. Louis, Oct., '86.

MICROSPHÆRA QUERCINA (Schw.) Burrill.—On *Quercus imbricaria*, Bluff Lake, Nov., '86; *Q. macrocarpa*, Bluff Lake, Oct., '87.

MICROSPHÆRA RUSSELLII, Clinton.—On *Oxalis corniculata*, var. *stricta*, Palatine, Aug., '86, Bluff Lake, Oct., '87.

MICROSPHÆRA SEMITOSTA, B. & C.—On *Cephalanthus occidentalis*, Bluff Lake, Oct., '86.

MICROSPHÆRA SYMPHORICARPI, Howe.—On *Symphoricarpus vulgaris*, Bluff Lake, Oct., '86.

SYNOPSIS OF THE NORTH AMERICAN SPECIES OF HYPOXYLON AND NUMMULARIA.

BY J. B. ELLIS AND B. M. EVERHART.

I. Macroxylon. Large, indurated, irregular, fibrous within.

a. Perithecia monostichous.

HYPOXYLON BROOMEIANUM, B. & C.*—Grev., IV, p. 94. On rotten logs. South Carolina, Rav., No. 1894. Irregular, brown, about 1¼ inches across, with a raised obtuse margin, about ¼ of an inch thick, brownish (within); surface quite even, with the exception of the punctiform ostiola; asci linear; sporidia uniseriate, elliptic, sec. Cke., in Grev., XI, p. 124, 12 x 14 μ.

*For the sake of brevity, lists of synonyms and references to the different Exsiccati have been mostly omitted. The subgenera are those adopted by Cooke in Grevillea.

b. Perithecia stratose.

HYPOXYLON OVINUM, Berk.—Grev., XI, p. 129. On wood, Orizaba, Mexico. Hemispheric or confluent-elongated, dark purple, hard, smooth, subshining, dark within; perithecia stratose, black, subglobose; ostiola obsolete; asci cylindrical; sporidia elliptical, dark, 16—18 x 7 μ.

HYPOXYLON PETERSII, B. & C.—Journ. Linn. Soc., X, p. 384. On rotten oak. Alabama (Peters), on dead wood; Cuba (Wright); on oak logs, Ohio and Kentucky (Morgan). Stroma pulvinate, depressed-obconic, centrally attached with a spreading margin, 3—4 x 2½—3 cm. across, covered at first by a thick, coriaceo-membranaceous veil which soon disappears except around the margin; substance corky-fibrous, hard, dull umber color, becoming darker outside; perithecia crowded in several layers, subglobose or subelongated, ½—¾ mm., with slender necks ending in distinctly prominent papilliform ostiola; sporidia uniseriate or subbiseriate above, narrowly-elliptical, brown, 6—8 x 3½—4 μ; asci cylindrical (p. sp.), about 40 x 5 μ or including the slender base 60 μ long.

The foregoing description is from Morgan's Ohio specimens, which have been compared by Dr. Farlow with specimens in Herb. Curtis. In the original description, in Linn. Journ., no mention is made of the thick, membranaceous veil, which is a striking and unusual character.

II. Sphæroxylon. Stroma superficial, globose or subglobose.

a. Externally colored, not black.

HYPOXYLON COCCINEUM, Bull. (*Sphæria fragiformis*, Pers.)—Stroma erumpent-superficial, subglobose, generally from ¼—¾ cm. in diameter, deep brick-red when mature, often paler when young, solitary or subconfluent; perithecia peripheric in a single layer, small, subglobose, slightly prominent; asci cylindrical, spore-bearing part 70—80 x 6—7 μ, paraphyses abundant, simple; sporidia uniseriate, opaque, inequilateral-elliptical, 10—12 x 4—5 μ. Generally on bark of dead beech trees, but also on oak, willow, birch and some other trees. Common throughout the United States and Canada as well as in Europe. This and the next species are often accompanied by an abnormal growth (*Institale acariforme*, Fr.) consisting of a spreading fringe of somewhat flattened, ochraceous or rust colored, more or less branched processes surrounding the base of the stroma and about equal in length to its diameter and bearing an abundance of very minute, obovate, subhyaline conidia. Whether this should be considered the true conidial stage of the *Hypoxylon* is doubtful, as its occurrence is exceptional. The case is in some respects analogous to that of *Sphæria flabelliformis*, Schw., and the *Xylaria* from which it springs, but with this difference: the affected *Xylaria* is always abortive, while the *Hypoxylon* surrounded with its conidial fringe matures its fruit.

HYPOXYLON HOWEIANUM, Pk.—24th Rep. N. Y. State Mus., p. 98. On dead limbs of deciduous trees. N. Y. (Peck), on *Ostrya Virginica;* Iowa (Holway), on dead standing shrubs and fallen limbs of oak; N. J. (Ellis), on dead limbs; Pennsylvania (Everhart & Rau.); Ohio (Morgan);

Nebraska (Miss L. S. Dond). Stroma depressed-globose, 5—15 mm. across, light brick-red, nearly smooth but closely punctate by the minute black ostiola, solitary or subconfluent; perithecia peripheric, monostichous, minute, ovate, ¼—⅜ mm. high; asci (spore-bearing part) 45—50 x5 μ, with a slender, thread-like base, 35 μ long; sporidia uniseriate, opaque, subinequilateral-elliptical, 6—7 x 3—3½ μ. The substance of the stroma is of a blue-black color, and a vertical section shows a radiate fibrous structure with one or two faint concentric zones. The interior of the stroma in *H. coccineum* is homogeneous in structure and of an even gray-black color. Shat species is also distinguished from this by its smaller stroma, roughened by the slightly projecting perithecia (⅛—½ mm. in diameter) and by larger asci and sporidia. In the Nebraska specimens the perithecia are distinctly prominent, but in other respects they do not differ from the normal form.

HYPOXYLON COMMUTATUM, Nitschke, var. HOLWAYANUM, S. & E.—Mich., II, p. 570; Sacc. Syll., II, XXV, Addenda. On bark of dead oak, Decorah, Ia., and on bark of dead plum trees and (maple [?]), Vermilion Lake, Minn. (Holway). Stroma erumpent-superficial, solitary or subconfluent, subglobose, hemispherical or oblong, ¼—⅝ cm. across, dull purplish-red, becoming black, grayish-black within, roughened by the distinctly prominent, ovate, monostichous, ⅝ x ½ mm. perithecia; asci (spore-bearing part) 75—80 x 6—7 μ, with abundant paraphyses; sporidia uniseriate, opaque, inequilateral-elliptical, 10—12 x 4½—5½ μ. According to Saccardo, the perithecia are larger and more prominent than in the typical form, which is described by Nitschke as having the stroma pulvinate, depressed, rarely hemispherical or nearly globose, solitary or connate with globose, crowded, subdistichous peripheric perithecia and sporidia, 10—12 x 6 μ. The smaller stromata resemble those of *H. fuscum*, from which it is distinguished by its smaller sporidia. From *H. multiforme* it is distinguished by its larger, darker sporidia.

HYPOXYLON ENTEROMELUM (Schw.)—*Sphæria enteromela*, Schw., Journ. Acad. Philada., Vol. V, p. 10. Erumpent from cracks in the bark of dead chestnut trees, Bethlehem, Pa. (Schw.). Rather rare. Stromata pulvinate, often longitudinally confluent for 6 inches in length, rusty red, surface not granulated, variable in shape, subcompressed, very black (within), covered above with a furfuraceous, pulverulent, rust-colored bark. Immersed in the stroma are a few perithecia of larger size, the others being minute, peripheric, globose and black. The stroma stains the inner bark black. In the nature of the outer layer of the stroma this is allied to *H. coccineum*. Sec. Cooke in Grev., XI, p. 123, the sporidia are 10 x 4 μ.

HYPOXYLON VERA CRUCIS, Berk. & Cke.—Grev. XI, p. 129. On rotten wood, Vera Cruz (Salle). Subglobose, superficial, often confluent (1—2 cm. in diameter), bright rust color, sooty black within; perithecia of medium size, ovate, peripheric, somewhat prominent; asci cylindrical; sporidia elliptical, attenuated at each end, brown, 20 x 8 μ.

HYPOXYLON ARGILLACEUM (Pers.)—*Sphæria argillacea*, Pers. Syn., p. 10. On trunks of ash; more rarely on beech and birch. Bethlehem, Pa. (Schw.); Canada (Maclagan); on beech, N. Y. (Peck). Stromata erumpent-superficial, subglobose, solitary, rarely connate, clay color, becoming black within; perithecia in a single layer (monostichous), rarely irregularly polystichous, ovate, small, crowded, somewhat prominent, minutely mammillose; conidial layer white, becoming stag color or clay color; conidia small, ovate, hyaline on long, sparingly branched, septate sterigmata; asci cylindrical, with very long, slender pedicels, spore-bearing part 140 x 16 μ; paraphyses simple, thread-like, longer than the asci; sporidia uniseriate, broad ovate, elliptical or subinequilateral, obtuse, opaque, 18—22 x 9—10 μ (22—24 x 10—12 μ Sacc. in Syll.) This species, of which we have seen no specimens except those sent from England by Dr. Plowright, seems to be easily recognized by its clay-colored stroma and large sporidia.

HYPOXYLON NOTATUM, B. & C.—Grev. IV, p. 50. On bark of *Celtis*. Carolina (Ravenel); on *Viburnum*, Pennsylvania (Michener). "Perithecia few, rather large, crowded into a little pulvinate mass clothed with rubiginous powder; ostiola at length prominent, truncate, with a central perforation. The sporidia, which are shortly cymbæform, vary a little in size."

In the specimens in Rav. Fungi Car. Exsicc., IV, No. 36 (the only ones we have seen) the little pulvinate erumpent masses (stromata) are 1—2 mm. across, each containing 2—6 perithecia having thick coriaceous walls and about ½ mm. in diameter. The asci are surrounded by abundant paraphyses and have the spore-bearing part 55—60 x 8 μ. Sporidia uniseriate, short cymbiform, opaque, 12—14 x 8 μ, as noted by Cke. in Grevillea XI, p. 123. The interior of the stroma shows a slight yellowish tint, like that of *H. Sassafras*, Schw., but not as distinct. The substance of the stroma is quite soft, almost carnose.

HYPOXYLON FUSCUM (Pers.)—Syn., p. 12. On dead alder, birch, hazel, beech and other deciduous trees. Common throughout the United States and Canada. Stroma erumpent-superficial, solitary or subconnate, depressed-pulvinate, or hemispherical, generally 1—3 mm. diameter, dark purplish-red, finally black, somewhat uneven from the slightly projecting, small, closely packed, irregularly monostichous; subglobose perithecia with minute mammiliform ostiola; conidia very minute, borne singly at the extremities of short, sparingly branched sterigmata; asci cylindrical on long pedicels, spore-bearing part 80—90 x 7—8 μ; paraphyses filiform; sporidia uniseriate, subinequilateral-elliptical, opaque and, in the specimens examined, 11—14 x 5—6 μ (12—16 x 5—7 μ, Sacc.)

HYPOXYLON BOTRYS. Nitsch.—Pyr. Germ., p. 34. On bark of dead willow tree, Pointe a' la Hache, La. Rev. A. B. Langlois, No. 376. Stromata erumpent, aggregated and subconnate or oftener tuberculiform, 1—2 mm. in diameter, consisting of simple aggregations of perithecia

with very little stromatic material interposed, golden yellow at first, finally black, about ½ mm. in diameter, about ¼ of the upper part of the perithecia projecting; asci cylindrical, 8-spored with filiform paraphyses; sporidia uniseriate, narrow-elliptical, brown, mostly 2-nucleate, 12—14 x 5—7 μ. The inner substance of the bark under the stroma is whitened. We have no authentic specimens of this species, but the Louisiana specimens agree so well with the description of *H. botrys*, Nits., that we have little hesitation in referring them to it.

HYPOXYLON BICOLOR, E. & E.—JOURN. MYCOL., II, p. 88. On dead limbs of *Quercus virens*, Pointe 'a la Hache, La. Rev. A. B. Langlois, No. 344. Stroma tubercular-hemispherical, about 2 mm. across, scattered, somewhat uneven from the slightly prominent perithecia, dull ferruginous-purple, becoming darker, within yellow, becoming darker with age; ostiola impressed, punctiform; perithecia subperipheric, closely packed, about ½ mm. in diameter; asci narrow-cylindrical, with a slender base, about 100 x 6 μ; sporidia in a single series, narrow-elliptical or subnavicular, pale yellowish at first, then opaque, 1—2-nucleate, 9—12x3½—4½ μ, ends subacute. Allied to *H. fuscum* but differs in its impressed ostiola and smaller stroma, yellow inside.

NOTE.—Sec. Cooke, in Grev., XI, p. 127, *Hypoxylon bicolor*, B. & C., is a *Diatrype*.

b. Stroma externally black.

HYPOXYLON MULTIFORME, Fr.—On dead birch. N. H (Farlow); N. Y. (O. F. Cook); Mich. (Miss Minns); Minnesota (Holway); Canada (Macoun). *Alnus*, *Sorbus*, *Quercus* and *Castanea* are also given as habitats of this species. Stroma erumpent and often margined by the ruptured bark of various shapes but on birch usually transversely elongated, oblong or elliptical, somewhat flattened above, 1—1½ cm. long by ½—¾ cm. wide or by confluence 4 or more cm. long, dull rusty red at first, finally black and smooth; perithecia irregularly monostichous, rather large, globose, distinctly prominent with papilliform ostiola; conidial layer dirty yellowish, becoming darker, conidia very small, obovate; asci cylindrical, on long pedicels, spore-bearing part 70—90 x 6 μ; paraphyses slender, simple, longer than the asci; sporidia uniseriate, inequilateral-oblong, pale brown, 9—10½ x 3½ μ (10—12 x 4—5 μ, Sacc.)

Specimens on *Alnus* sent from British Columbia by Dr. Macoun have the stroma depressed-hemispheric, 1—½ cm. across and the perithecia less prominent, but the asci and sporidia are the same.

This is a widely-diffused species, being found throughout Europe, also in Kamtschatka and the elevated region of Nepal in central Asia. Its range appears to be northward. It is generally found on limbs from which the bark has not yet fallen, but is also said to grow on decorticated limbs and is then more effused. The specimens we have seen of this effused form seem rather to belong to *H. rubiginosum*.

HYPOXYLON TERES, Schw.—Syn. N. Am.; No. 1178. On bark. Locality unknown. "Pulvinate, subterete-cylindrical, apex obtuse, rounded, surface tuberculose-undulate, rust-colored; stroma sooty black, surrounded and roughened by the immersed peripheric perithecia. The cylindrical, pulvinulate, scattered stromata are about three lines high and 1½ lines thick. In some respects allied to *H. rubiginosum*."

HYPOXYLON MALLEOLUS, B. & Rav.—Grev., IV, p.49. On oak trees. Carolina (Ravenel); Florida (Dr. Martin, Calkins and Rau.) Stroma globose, sessile, 1½ cm. in diameter, black, ornamented by the papillose ostiola, each sunk in a shallow, circular depression about ½ mm. across. A vertical section of the stroma shows the same radiate-fibrous, subzonate structure and shining black color seen in *H. Howeianum*. Perithecia peripheric, oval or elliptical in outline, forming a layer about 1 mm. thick, which readily separates from the inner mass of the stroma. The asci (which appear to be evanescent) have, in our specimens, disappeared, but there is an abundance of brown, fusoid, nearly straight sporidia, 18—22 x 3—3½ μ, ends subobtuse.

HYPOXYLON COHÆRENS, Pers.—Syn., p. 11. On bark of beech. Carolina (Ravenel); N. Y. (O. F. Cook); Penna. (Rau.) Stromata erumpent-superficial, depressed-globose, about 2 mm. in diameter, continuously connate over a space of three or more centimeters across, of a dirty black color; perithecia mostly only 6—10 in a stroma, rather large and distinctly prominent, with papilliform ostiola; asci cylindrical, spore-bearing part about 22 x 6 μ; sporidia uniseriate, short-navicular, brown, 9—11 x 4—5 μ (12 x 6 μ, Sacc.) The foregoing description is from the specimens in Rav. Car., III, No. 48. The conidial hymenium which clothes the young stromata is of a pale clay color, becoming cinereous; conidia obovate-subglobose, very small. The species is widely diffused and is found also on oak, *Nyssa* and maple. A small form, var. *minor*, is mentioned on decaying *Polyporus* in Borneo. In the old and blackened state, this species resembles outwardly some forms of *H. coccineum*, Bull., from which it differs in its smaller connate stromata and larger perithecia and in the different color of the young stroma.

HYPOXYLON MURRAYI, B. & C.—Grev., l. c. On dead bark. Massachusetts (Murray). "Gregarious, subglobose, a line or more broad, black without and within, densely papillose with the minute ostiola. It resembles externally *H. bomba*, Mont., except the densely papillose surface." Sporidia sec. Cke. in Grev., XI, p. 123, 13—15 x 5—7 μ.

HYPOXYLON GLOMIFORME, B. & C.—Grev., l. c. On bark of *Quercus nigra*, Connecticut (Wright). "Gregarious, hemispherical, nearly ¼ inch wide, at first clothed with ferruginous powder, then black and shining, even; perithecia hidden without any external trace of ostiola; stroma dark brown." Sporidia sec. Cke., Grev., l. c., 14—15 x 3½ μ.

HYPOXYLON TURBINULATUM, Schw.—Syn. N. Am. On beech wood, Mt. Pocono, Pa. (Schweinitz). "Turbinate-pulvinate, applanate, subcon-

fluent, but with the stromata (pulvinuli) always distinct; perithecia larger than usual, not peripheric but scattered through the entire stroma even to the base; external surface granulated, pulverulent, rugose with the minute, rather prominent ostiola; stroma scanty, dirty whitish; clusters of perithecia arranged in a seriate manner so as to bear some resemblance to Hebrew letters and seated on a black crust which overspreads the bark." Sporidia sec. Cooke, 12 x 3½ μ.

NEW SPECIES OF FUNGI FROM VARIOUS LOCALITIES.

BY J. B. ELLIS AND B. M. EVERHART.

SEPTORIA SANICULÆ, E. & E.—On living leaves of *Sanicula Marilandica*. Racine, Wis., November, 1887, Dr. J. J. Davis. Leaf mottled with small, irregular, subindefinite, brown spots, enclosing still smaller (½—1 millim.), white spots, on each of which are 1—3 minute, black perithecia; sporules spiculiform, slightly curved, about 20 x 1 μ or less.

SEPTORIA NEPETÆ, E. & E.—On living leaves of *Nepeta Cataria*. Racine, Wis., June, 1887, Dr. J. J. Davis. Spots purplish-brown, with reddish or purplish border, rather irregular in outline, about two millim. in diameter, with a white center; perithecia mostly epiphyllous, lenticular, not very abundant; sporules nearly straight, nucleolate, 30—40 x 1½ μ.

SEPTORIA ASCLEPIADICOLA, E. & E.—On living leaves of *Asclepias incarnata*. Power's Lake, Kenosha county, Wis., June, 1887, Dr. J. J. Davis. Spots amphigenous, small (1—2 millim.), round, dull white, with a narrow, dark, distinctly-raised border, around which the leaf is stained purplish-red. The spots are often clustered together, 3—4 lying in contact with a common, raised border surrounding the whole; sporules linear-fusoid, nucleate, hyaline, 25—50 x 2—2½ μ, ends mostly acute and one end generally a little thicker.

HELMINTHOSPORIUM HADOTRICHOIDES, E. & E.—On living but partly dead leaves of *Eragrostis major*. Faulkland, Del., September, 1887, A. Commons, No. 347. On elongated, white spots, or on dead tips of the leaves, mostly epiphyllous; hyphæ loosely tufted, erect, smoky-brown, continuous or with 1—2 septa, 30—35 x 6—7 μ, the apex swollen so as to form a knob like the head of a pestle, 8—12 μ in diameter. The hyphæ are finally proliferous, the axis of growth being prolonged by one side of the swollen head or tip, thus forming a series (2—4) of offsets or steps. The conidia are clavate-obovate or clavate-cylindrical, yellowish-brown.

HELMINTHOSPORIUM SUBOLIVACEUM, E. & E.—On dead bark of *Acer rubrum*, Clyde, N. Y., October, 1887. O. F. Cook. Subcæspitose in

cracks or openings in the bark made by some *Cytispora* or abortive *Valsa*. Hyphæ erect, septate, brown, equal, 100—120 x 3—4 μ; conidia subelliptical (terminal [?]), subhyaline at first, then brown and mostly 3-septate but scarcely constricted at the septa, subacute at each end with a short persistent pedicel at base, 30—40 x 10—14 μ.

ALTERNARIA LANCIPES, E. & E.—On living leaves of *Argemone platyceras*, Manhattan, Kansas, August, 1887. W. T. Swingle, 957. Hypophyllous, subolivaceo-velutinous, on round, black, concentrically wrinkled subindefinite spots 2—5 mm. in diameter; hyphæ short, erect, subfasciculate, pale olivaceous, soon becoming swollen in a nodulose manner above from the incipient conidia which are at first concatenate but soon deciduous, mostly 3-septate and strongly constricted at the septa, the lower cell narrowed to an acute point, the upper rounded and obtuse and at length one or more of the upper cells divided by a longitudinal septum. This seems to be well characterized by the wedge-like or lance-pointed base of the conidia. *Gloeosporium Argemonis*, E. & E., occurs on some of the spots.

BOTRYTIS GRISEO-LILACINA, E. & E.—On bark of dead oak trunks, Concordia, Mo., October, 1887. Rev. C. H. Demetrio. Prostrate sterile hyphæ brown, intricate, branched, coarse (3—4 μ in diameter), forming continuous grayish-lilac patches ½—2 cm. across, with a whitish, definite, minutely subfimbriate margin, fertile erect hyphæ pale, simple or sparingly branched and often subundulate above, forming subpulvinate tufts and bearing the subhyaline elliptical conidia (5—9 x 3—4 μ) at their tips. Apparently allied to *B. lilacina*, Schw.

FUSARIUM HYDNICOLUM, E. & E.—Parasitic on *Hydnum membranaceum*, Bull., growing on bark of dead oak, Concordia, Mo., October, 1887. Rev. C. H. Demetrio. Enveloping the teeth of the hydnum in a thin white mycelium; conidia minute, subglobose, 2—2½ μ or elliptical, 2-nucleate, 3—5 x 2—2½ μ. Belongs in Saccardo's Sect. *Leptosporium*.

FUSARIUM BARBATUM, E. & E.—On *Usnea barbata*, Newfield, N. J., January, 1888. Sporodochia applanate, subconfluent, cinereous at first, then orange; hyphæ erect, simple, hyaline, continuous or faintly septate, attenuated above, 20—25 x 2½ μ at the base, bearing at their tips the pyriform, hyaline, continuous, 4—6 x 2—2½ μ conidia. Belongs in Sect. *Leptosporium*, Sacc.

STAGONOSPORA SEPTORIOIDES, E. & E.—On dead leaves of *Quercus imbricaria*, Starkville, Miss., November, 1887. S. M. Tracy. Perithecia innate-erumpent, small, hypophyllous; sporules cylindrical, subhyaline, 3—9 septate, 15—25 x 4 μ, oozing out and staining the leaf around the perithecia.

MELASMIA GLEDITSCHIÆ, E. & E.—On living leaves of *Gleditschia triacanthos*, Concordia, Mo., October, 1887. Rev. C. H. Demetrio. Peri-

thecia hypophyllous, flattened, rugulose, ½—1 mm. in diameter, thickly scattered over the part of the leaf occupied, which turns dark brown; sporules oblong, hyaline, 3—5 x 1—1¼ μ, continuous, borne on densely fasciculate basidia 10—12 μ long. Found also in Louisiana by Rev. A. B. Langlois and at Manhattan, Kansas, by Kellerman & Swingle (No. 1206).

STILBUM CAPILLARE, E. & E.—Parasitic on *Trichia varia*, Jamesville, N. Y., October, 1887. O. F. Cook. Stem capillary, white, smooth, ½—¾ mm. high, 20—25 μ thick, head ovoid, with a slight tinge of flesh color, about 75 μ in diameter; conidia oblong-elliptical, 3—4 x ¾ μ, 2-nucleate, hyaline. Outwardly resembling very closely *S. aciculosum*, E. & E., but differs in its smooth stem, smaller, paler head and much larger conidia. *S. aciculosum* has the stem glandular-tomentose and head distinctly flesh color.

RAMULARIA CREPIDIS, E. & E.—On leaves of *Crepis glauca*, Raton, New Mexico, June, 1886. Prof. S. M. Tracy. Amphigenous on orbicular, subconcentrically wrinkled, pale spots ½—¾ cm. in diameter, with a brown margin; hyphæ cæspitose, erect, rigid, nearly straight, subattenuated and sparingly toothed above, 25—35 x 4—5 μ, continuous; conidia variable, acute, elliptical, 12 x 5—6 μ, or fusoid, cylindrical or oblong, 20—35 x 5—8 μ, hyaline, finally 1-septate. The *Ramularia* occupies the light-colored center of the spots, the remaining areas of which are thickly covered with small, black, erumpent perithecia which in the specimens seen were yet filled with granular matter.

PESTALOZZIA MICROSPORA, E. & E.—On fallen leaves of *Quercus coccinia*, Newfield, N. J., March, 1882. Acervuli amphigenous but more abundant below, prominent, black, thickly scattered over the leaf but without any definite spots; conidia narrow-elliptical, 3-septate, pale brown except the small terminal hyaline cells, colored portion about 7—9 x 4 μ, terminal bristle 10—12 μ long, basidia slender, 20—25 μ long. Quite distinct from *P. monochæta*, Desm., in its smaller, paler, 3-septate conidia and in the absence of any spots.

PESTALOZZIA PALLIDA, E. & E.—On fallen leaves of *Quercus alba*, Ohio, June, 1883. Dr. W. A. Kellerman, No. 258. Acervuli mostly hypophyllous, scattered without definite spots, erumpent, discoid, 75—150 μ in diameter; conidia fusoid, 4-septate, the three inner cells yellowish-hyaline, the two terminal ones quite hyaline and acute, the upper one prolonged into a short (6—9 μ) curved bristle; basidia 10—12 μ long, sometimes branching below. The septa project or stand out on the body of the spore like hoops on a barrel. The conidia are about 3 μ thick and 12 μ long between the extreme septa. Well characterized by its pale, banded conidia.

NEW LITERATURE.

BY W. A. KELLERMAN.

"MONOGRAFIA DEI GENERI PLEOSPORA, CLATHROSPORA E PYRENOPHORA (CONTINUAZIONE)." Di Augusto Napoleone Berlese. Nuovo Giornale Botanico Italiano. 7 Aprile, 1888.

"DU PARASITISME DE LA TRUFFE (SUITE)" par Henri Bonnet. Revue Mycologique, Avril, 1888.

"DIAGNOSES FUNGORUM NONNULLORUM NOVORUM IN FENNIA DETECTORUM." Auctore P. A. Karsten. l. c.

"MONSTMOSITES DANS LES CHAMPIGNONS," par William Phillips. l. c.

"FUNGI EXSICCATI PRECIPUE GALLICI." Centurie, XLVe. C. Roumeguere.

"THE DISCOMYCETES OF THE BIRMINGHAM DISTRICT." By W. B. Grove, B. A. The Midland Naturalist, April, 1888.

"REVISION OF SCOTCH SPHÆROPSIDEÆ AND MELANCONIEÆ, CONTINUED." By Prof. J. W. H. Trail. The Scotch Naturalist, April, 1888.

"MYKOLOGISCHES AUS DEM SCHWARZWALD," von G. Lagerheim. Mitteilungen des Botanischen Vereins Baden, 1888, No. 45.

"UEBER EINE NEUE PERONOSPORA-ART (P. LAPPONICÆ) AUS SCHWEIDISCH-LAPPLAND." Af Lagerheim. Afddag ur Botaniska Notiser, 1888.

"STUDIER ŒFVER SVAMPSLÆGTET TAPHRINA." Af C. J. Johanson. Stockholm, 1887. Pp. 1-28, 1 plate (eight species figured).

"DIE PILZE DER OBSTGEWACHSE—NAMENTLICHES VERZEICHNISS ALLER BISHER BEKAMET GEWORDENEN UND BESCHRIEBENEN PILZARTEN, WELCHE AUF UNSEREN OBSTRÆUCHERN UND KRAUTARTIGEN OBSTPFLANZEN VORKEMMEN," von Felix von Thuemen. Wien, 1887, pp. 1-126.

"BULLETIN FROM THE BOTANICAL DEPARTMENT OF THE STATE AGRICULTURAL COLLEGE, AMES, IOWA." Byron D. Halsted, Sc. D. professor of Botany, 1888, pp. 1-118.

The mycological articles contained in this bulletin are "Germination of Ergot of Wild Barley," "Relation of Rusts of Juneberry and Dwarf Juniper," "Notes upon the Ustilagineæ," "Triple-celled Teleutospores of Puccinia Tanaceti, DC.," "Downy Mildews in a dry season," "Provisional List of Provisional Species of Fungi" and "California Parasitic Fungi." The following are the new species described:

Cercospora anomala, Ellis & Halsted. On leaves of *Actinomeris squarrosa*, Iowa.

Cercospora lateritia, Ell. & Halsted. On leaves of *Sambucus racemosa*, Iowa.

Cercospora Lycii, Ell. & Halsted. On leaves of *Lycium vulgare*, Iowa.

Cercospora Oxybaphi, Ell. & Halsted. On *Oxybaphus nyctagineus*, Ia.

Cylindrosporium Iridis, Ell. & Halsted. On living leaves of *Iris versicolor*, Iowa.

Phoma Virginiana, Ell. & Halsted. On *Prunus Virginiana*, Iowa.

Septoria Rudbeckiæ, Ell. & Halsted. On *Rudbeckia triloba* and *R. laciniata*, Iowa.

Vermicularia sanguinea, Ell. & Halsted. On living leaves of some introduced *Panicum*, Iowa.

Uromyces digitatus, Halsted. On leaves of *Leersia Virginica*.

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